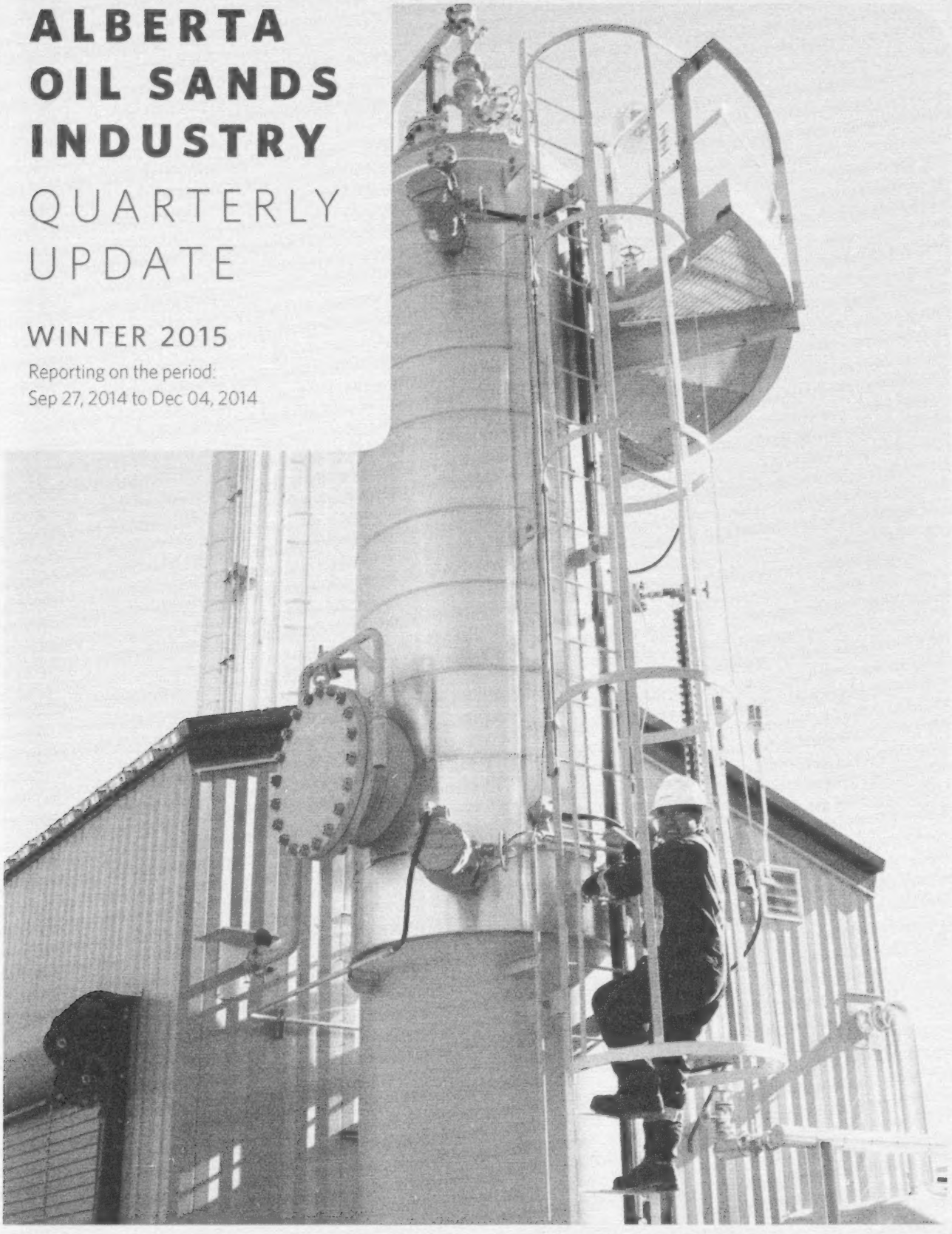
ALBERTA OIL SANDS INDUSTRY QUARTERLY UPDATE

WINTER 2015

Reporting on the period:
Sep 27, 2014 to Dec 04, 2014



All about the oil sands

Background of an important global resource

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Canada has the third-largest oil reserves in the world, after Saudi Arabia and Venezuela. Of Canada's 173 billion barrels of oil reserves, 170 billion barrels are located in Alberta, and about 168 billion barrels are recoverable from bitumen. This is a resource that has been developed for decades but is now gaining increased global attention as conventional supplies—so-called "easy" oil—continue to be depleted. The figure of 168 billion barrels of bitumen represents what is considered economically recoverable with today's technology, but with new technologies, this reserve estimate could be significantly increased. In fact, total oil sands reserves in place are estimated at 1.8 trillion barrels.

There are three major bitumen (or oil sands) deposits in Alberta. The largest is the Athabasca deposit, which is located in the province's northeast in the Regional Municipality of Wood Buffalo. The main population centre of the Athabasca deposit is Fort McMurray. The second-largest oil sands deposit is referred to as Cold Lake, just south of Athabasca, with the main population centre the City of Cold Lake. The smallest oil sands deposit is known as Peace River, which is located in northwest-central Alberta. A fourth deposit called Wabasca links to the Athabasca and is generally lumped in with that area.

The existence of bitumen in Alberta has been known for a long time. The first mention of it in Canadian history was in 1719, when a Cree named Wapasu brought a sample of the "gum" to a Hudson's Bay trading post. First Nations in what is now the Wood Buffalo area had traditionally used the bitumen, which seeps from outcrops along the Athabasca River, to waterproof their canoes.

For the first time in 2012, in situ oil sands production exceeded mined oil sands production in Alberta. In 2013, 53 per cent of the province's oil sands volumes were produced using in situ methods. Alberta will continue to rely to a greater extent on in situ production in the future, as 80 per cent of the province's proven bitumen reserves are too deep underground to recover using mining methods.

There are essentially two commercial methods of in situ (Latin for "in place," essentially meaning wells are used rather than trucks and shovels). In cyclic steam stimulation (CSS), high-pressure steam is injected into directional wells drilled from pads for a period of time, then the steam is left to soak in the reservoir for a period, melting the bitumen, and then the same wells are switched into production mode, bringing the bitumen to the surface.

In steam assisted gravity drainage (SAGD), parallel horizontal well pairs are drilled from well pads at the surface. One is drilled near the top of the target reservoir, while the other is drilled near its bottom. Steam is injected into the top well, a steam chamber forms, and the melted bitumen flows into the lower well via gravity and is pumped to the surface using artificial lift.

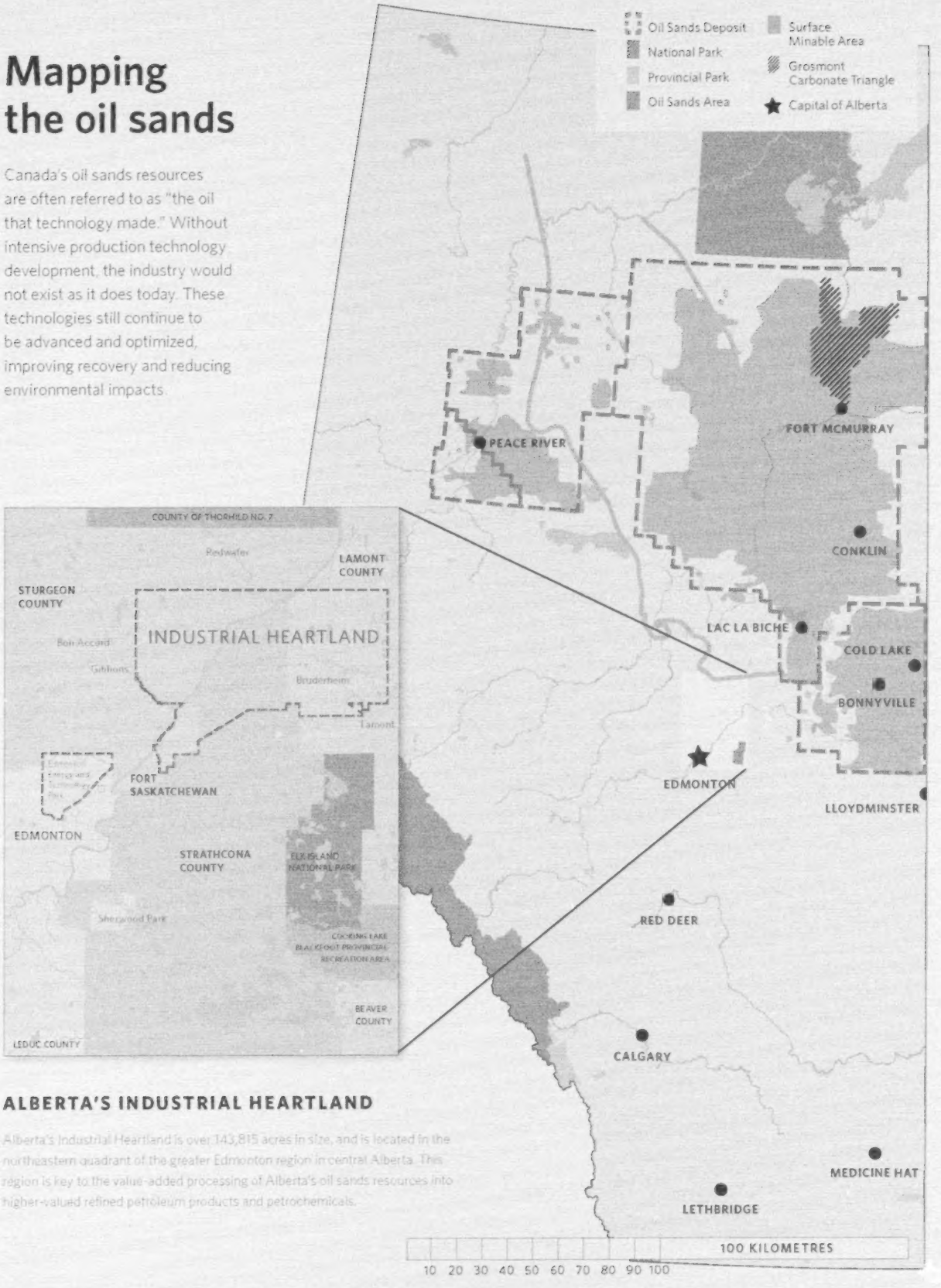
Both SAGD and CSS are used in the Cold Lake and Peace River deposits, while SAGD is the in situ technology of choice in the Athabasca deposit. The selection is based on a number of factors, including geology. The technologies combined currently produce just over one million barrels per day.

Research is underway on a number of other production technologies designed to optimize production, including variations on solvent-assisted SAGD and CSS, recovery using electricity and in situ combustion.

Bitumen that has not been processed, or "upgraded," can be used directly as asphalt. It must be diluted to travel by pipeline. Adding value, some producers upgrade their product into synthetic crude oil, which is a refinery feedstock. That can be transformed into transportation fuels and other products. ■

Mapping the oil sands

Canada's oil sands resources are often referred to as "the oil that technology made." Without intensive production technology development, the industry would not exist as it does today. These technologies still continue to be advanced and optimized, improving recovery and reducing environmental impacts.



ALBERTA'S INDUSTRIAL HEARTLAND

Alberta's Industrial Heartland is over 143,815 acres in size, and is located in the northeastern quadrant of the greater Edmonton region in central Alberta. This region is key to the value-added processing of Alberta's oil sands resources into higher-valued refined petroleum products and petrochemicals.

GOVERNMENT UPDATE

Alberta Government

STATEMENT FROM PREMIER PRENTICE ON MEETING WITH THE FORT CHIPEWYAN COMMUNITY

Premier Jim Prentice issued the following statement after meeting with representatives from the Fort Chipewyan community in November:

"Today I was pleased to visit the Fort Chipewyan community where I met with Chief Allan Adam of the Athabasca Chipewyan First Nation, Chief Steve Courtoreille of the Mikisew Cree Nation and President Fred Fraser of the Metis Local 125. During our meetings, we discussed concerns and priorities regarding employment and consultation on resource development near their community.

"These groups have been vocal about the concerns they share about oil sands development. Our discussion has helped me understand these concerns, and together we explored possible solutions that could incorporate traditional knowledge into environmental monitoring efforts, how we could work with the community to help them stay healthy and how we could help support their participation in resource development projects, should they wish it.

"Visiting Fort Chipewyan was important to me, and I appreciated today's frank and open dialogue on economic, environmental and health matters."

NEW SESSION OF ALBERTA LEGISLATURE PRIORITIZES ESTABLISHING THE PROVINCE AS AN ENVIRONMENTAL LEADER

The fall legislative session kicked off in November with a speech from the throne that highlighted the need for Alberta to build on its leadership in environmental performance, read by the honourable Donald S. Ethell, lieutenant-governor of Alberta.

"If we talk about being a leader in the energy, agriculture or forestry business, then we are in the environment business. Our customers expect this, and Albertans themselves demand it. Clean air, fresh water and thriving biodiversity are part of our identity as Albertans and Canadians—something which Alberta shares with visitors from around the world through our exceptional tourism industry.

"But we cannot just spread the word on the steps we have already taken. Alberta must take meaningful, effective action to show we are as serious about the environment business as we are about the energy business.

"This includes ongoing work with stakeholders and industry on the development of a new tailings management framework and taking action to protect the Athabasca River and its neighbouring ecosystems.

"Alberta must build on the leadership that made us the first jurisdiction in North America to regulate greenhouse gas emissions, and among the first to put a price on carbon.

"We will bring all parties—industry, environmental groups, Aboriginal groups and all affected impacted Albertans—to the table to find common ground on environmental, economic and social priorities.

"In the year ahead, our work will expand through the development of a new climate change framework that will outline strategies to drive emissions reductions.

"This means moving increasingly towards lower emissions sources, including natural gas and renewables.

"It means ensuring Alberta communities are more resilient to the impacts of a changing climate.

"It includes advancing efforts to monitor, measure and report on our progress.

"It means pursuing local and global partnerships and alliances to maximize our results. We will ensure that Alberta industry remains competitive, and we will meet the challenge of demonstrating real environmental leadership through meaningful action."

LAND DEAL CLEARS THE WAY FOR AFFORDABLE HOUSING IN FORT MCMURRAY

The Government of Alberta has completed a deal to purchase the federal government's interest in the four-acre Willow Square site near downtown Fort McMurray. The province will transfer the land to the Wood Buffalo Housing and Development Corporation (WBHDC) to develop a wide range of housing options to meet the needs of the community, including seniors.

"Alberta families and seniors deserve accessible, comfortable and affordable housing options close to home. For that to happen in such a rapidly developing region like Wood Buffalo, land must be available and brought on stream for development. This agreement will provide the municipality with the tools it needs to meet the community's varied housing needs," says Jim Prentice, premier of Alberta.

The site had been jointly-owned by the provincial government and the federal government's national housing agency, the Canada Mortgage and Housing Corporation.

This agreement will see the 75 per cent federal share of the land transferred to the Alberta Social Housing Corporation, which currently holds a 25 per cent ownership in the property.

In addition to the land, the WBHDC will also receive approximately $3 million in provincial funding to develop the site.

The housing management body plans to develop needed accommodations such as self-contained apartments and lodge units for lower-income, functionally-independent seniors. The municipality will also develop housing for lower-income, non-senior residents.

"Today's important announcement by the Alberta government provides the opportunity to develop Willow Square for the well-being of our seniors and residents. We look forward to working in collaboration with WBHDC and the Advisory Committee on Aging in fostering the facilities our seniors need and deserve," says Melissa Blake, mayor of Regional Municipality of Wood Buffalo.

The Willow Square site is currently vacant land. It once contained a 1960s-era affordable housing complex, which was demolished due to its age.

ALBERTA AND QUEBEC TALK ENERGY, ENVIRONMENT AND CLIMATE CHANGE

Alberta Premier Jim Prentice and Quebec Premier Philippe Couillard took the first steps in building a strong partnership between the two provinces in a meeting in December, after which Prentice offered the following statement:

"I was delighted to meet with Premier Couillard at the Quebec National Assembly. We discussed a series of issues, infrastructure development, the national securities regulator, as well as energy, environment and climate change. We agreed to work together on issues that impact the good of Canada.

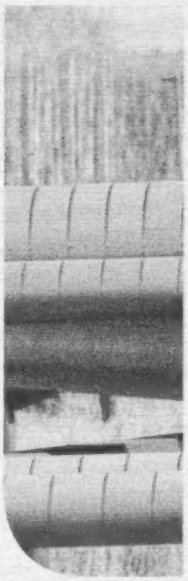
"This meeting allowed me to share perspectives with Premier Couillard across a range of areas of shared interest, including the environment, energy development and export, and the Energy East Pipeline. As major energy producing provinces, Alberta and Quebec understand the importance of national energy infrastructure and are committed to responsible resource development that respects the environment and our communities.

"There are a number of ways that Alberta and Quebec can work together to advance our shared interests here.

"In addition, I look forward to attending Premier Couillard's summit on climate change in April and to welcoming Premier Couillard to Alberta in the coming months.

"Today's meeting was a positive step forward, and I look forward to building this relationship." ■

LABOUR UPDATE



PETROLEUM HUMAN RESOURCES COUNCIL SURVEY EXAMINES WHAT OIL AND GAS COMPANIES SAY ABOUT THEIR WORKFORCE CHALLENGES AND RECRUITMENT STRATEGIES

This fall, 31 oil and gas companies responded to a survey on current workforce challenges and trends within Canada's oil and gas industry. These companies, representing over 63,300 workers, provided information on their hiring activities, in-demand jobs and hiring locations.

The survey, conducted by the Petroleum Human Resources Council of Canada, found that the majority of respondents are actively hiring and face critical workforce challenges. The top three of these challenges are:

- Attracting and retaining workers in hard-to-recruit locations;
- Skill shortages; and
- Employee turnover/retention.

The "HR Trends and Insights: Fall 2014 Survey Results" infographic (available now) summarizes the responses from 31 companies in the Canadian oil and gas industry. Please note: the industry changes quickly, and the survey results reflect a "moment in time" snapshot.

GREATER LABOUR MOBILITY FOCUS OF PREMIERS' MEETING

Premier Jim Prentice issued the following statement in December after meeting with Nova Scotia Premier Stephen McNeil and signing two labour mobility agreements:

"Alberta and Nova Scotia have engaged in ongoing work to improve apprentice mobility between our provinces. Today, we signed agreements designed to improve apprentice mobility and promote the mutual recognition of pre-employment training between our provinces. Labour mobility is a key element of a strong labour market and contributes to economic growth, innovation and productivity.

"Whether it's at the Council of the Federation or one-on-one meetings, Alberta and Nova Scotia have a long history of working together. I look forward to working with Premier McNeil on areas of mutual interest for our provinces."

OIL SANDS CONSTRUCTION AND OPERATIONS WORKFORCE TO GROW BY 35 PER CENT BY 2019

The new Oil Sands Construction, Maintenance and Operations Labour Demand Outlook to 2023 projects that:

- The workforce required for Alberta's oil sands construction and operations will grow from 72,810 jobs in 2014 to 98,380 jobs in 2023, accounting for a 35 per cent increase with a peak of 95,530 jobs in 2019.
- Of the 98,380 jobs that will be generated in Alberta over the next decade, 41,880 jobs (representing 42.6 per cent) will be in oil sands operations and 56,500 jobs will be aggregated oil sands construction jobs (accounting for 57.4 per cent).
- Of the 41,880 oil sands operations jobs that will be generated by 2023, 5,680 jobs will be in the in situ sub-sector, 13,880 jobs will be in the mining sub-sector and 22,320 jobs will be in the upgrader sub-sector.

The report also indicates that the labour force needed for on-site oil sands construction, turnaround and ongoing maintenance projects is expected to increase from approximately 48,710 jobs in 2014 to about 56,900 jobs in 2020 (a 17 per cent increase over 2014 levels) with a peak of about 59,390 jobs in 2019.

The impacts of labour and skills shortages in our province are far-reaching. Providing timely and accurate labour market information helps stakeholders make solid workforce planning decisions to address Alberta's ongoing labour-force challenges.

PILOT PROGRAM TO INCREASE RANKS OF POWER ENGINEERS

The Oil Sands Community Alliance (OSCA) has partnered with Suncor, Shell Canada, ConocoPhillips, Cenovus and Husky Energy on a pilot project focused on increasing the power-engineering talent pool available to the oil sands.

Following an October summit with industry members and learning institutions, OSCA is compiling input and considering actions for 2015 that will help address key bottlenecks affecting the timely training and certification of power engineers.

The organization says it also plans to work with other groups to provide improved employment information for the industry. ■

WHAT'S NEW IN THE OIL SANDS

BUSINESS

A new report released by the Canadian Energy Research Institute (CERI) forecasts oil sands production (upgraded and non-upgraded) to reach 3.7 million barrels per day (bbls/d) by 2020 and 5.2 million bbls/d by 2030, up from approximately two million bbls/d today. New capital investment, sustaining capital and operating revenues will contribute an estimated $3.87 trillion to the Canadian gross domestic product (GDP), CERI says.

The numbers are considered to be conservative as the report is based on US$85-per-barrel WTI oil, says CERI chief executive officer Peter Howard. He notes that when researchers were working on the report in summer 2014, the figure was seen as the most conservative view of the economic potential of the oil sands.

Although the study includes some projects that have been announced, the majority are either on production, under construction, approved and waiting to start construction, or waiting to go to the regulator.

Changes in how Statistics Canada collects data on the oil sands, including separating oil sands operations from the mining and extraction sector, resulted in a different view of the impact of the oil sands across the country, Howard says. "One of the big deals—other than the big dollars—is that 11 per cent of the GDP impacts are felt outside Alberta—double what the previous report said."

TransCanada Corporation marked a major milestone in the development of its proposed $12-billion Energy East Pipeline project with the formal filing of its regulatory application with the National Energy Board in late October. The project, which would transport crude oil from western Canada to refineries in Quebec and on to the Irving Oil refining complex in Saint John, N.B., faces steep opposition from environmental groups.

TransCanada anticipates the pipeline will be in service for deliveries in Quebec and New Brunswick by late 2018, subject to receiving the necessary regulatory approvals and permits.

Fluor has been awarded an engineering, procurement, fabrication and construction contract for the utilities scope of the Fort Hills oil sands mining project.

Fluor plans to use its proprietary third-generation modular execution technology on the project. First oil from the 180,000-bbl/d mining installation is expected as early as the fourth quarter of 2017.

Canadian Natural Resources Limited has completed the expansion of its Horizon Coker Plant (Phase 2A), and production of synthetic crude oil has recommenced with a targeted increase in production capacity to 127,000 bbls/d. This is an increase from the previous production capacity of 115,000 bbls/d.

The coker tie-in, and the associated increase in coker capacity, was originally scheduled to be completed in mid-2015; however, due to strong construction performance and the early completion of the coker installation, Canadian Natural accelerated the tie-in to mid-2014.

Phase 2A is one step in a staged expansion that will bring production at the integrated Horizon mining and upgrading project to 250,000 bbls/d. The next step, Phase 2B, is targeted to be completed in late 2016 and will add 45,000 bbls/d of production capacity, followed by Phase 3, which will add 80,000 bbls/d of production capacity, targeted for late 2017. Canadian Natural says that expansion activities remain on schedule and within sanctioned cost estimates.

Suncor and its partners have awarded Técnicas Reunidas, an international engineering company based in Madrid, a lump-sum turnkey model contract worth approximately $250 million for the cogeneration plant at the 180,000-bbl/d Fort Hills oil sands mining project.

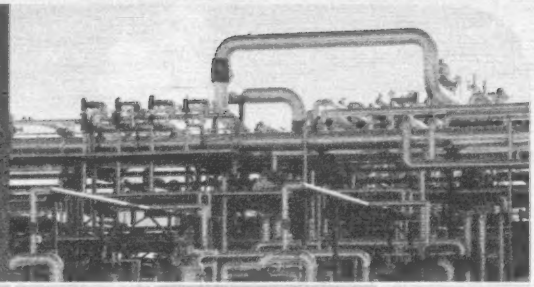
The contract includes the engineering, procurement, construction (EPC) and pre-commissioning to mechanical completion for the installation of two nominal 85-megawatt gas turbines, two steam production heat recovery steam generators and all the related auxiliary systems for its interconnection with the utilities system of the Fort Hills oil sands mine.

The cogen project is expected to be completed in 31 months. It is the first EPC power project in North America for Técnicas Reunidas.

PHOTO: ABMI (FLICKR)

WHAT'S NEW IN THE OIL SANDS

TECHNOLOGY



N-Solv Corporation says that its pilot project of bitumen extraction solvent technology (BEST) near Fort McMurray has reached a milestone of 25,000 barrels of oil production since its start-up in spring 2014.

The BEST process is a water-free technology that produces 80-85 per cent lower greenhouse gas (GHG) emissions during extraction, N-Solv says. It is being piloted at Suncor Energy Inc.'s Dover site.

"The pilot project clearly demonstrates that the science works. Reaching 25,000 barrels of production is on its own a major step in validating the technology, but we have also achieved that without any significant interruptions along the way, which speaks to the robustness of the process," says John Nenniger, N-Solv's chief executive officer. "N-Solv has been fielding requests for scaled-up projects; we are reviewing them on a reservoir-by-reservoir basis."

Excelsior Engineering has been selected by Field Upgrading as the engineering, procurement and construction management contractor for the development of a pilot facility that aims to commercialize technology to improve the economics of upgrading Alberta's bitumen.

In 2012, Calgary-based Excelsior partnered with Vepica Grupo International, a multinational engineering and construction company based in Spain with offices in Houston, Colombia, Argentina, Mexico and China.

Field Upgrading is led by oil sands heavyweights Guy Turcotte (founder and chair of Western Oil Sands) and Neil Camarta (former oil sands executive with Shell Canada Limited, Petro-Canada Limited and Suncor Energy Inc.). The company's technology pilot has funding from Alberta Innovates - Energy and Environment Solutions.

AECOM Technology Corporation has announced its involvement in three research projects created by Canada's Oil Sands Innovation Alliance (COSIA).

The three separate research projects are designed to reduce water use and increase water-recycling rates at oil sands mining and in situ operations.

The 13 member companies of COSIA are now sharing more than 777 environmental technologies that cost over $950 million to develop, having started 68 projects during 2014, the group said at its annual performance update in November.

COSIA now has 238 projects moving forward, at a cost of nearly $400 million.

The alliance has four environmental priority areas (EPAs) and this year, its members agreed to their first performance goal, in the water EPA.

The goal states that its in situ operators will strive to reduce fresh water use intensity by 50 per cent by 2022. Achieving this would result in its members using 0.2 barrels of fresh water per barrel of bitumen produced instead of the current 0.4 barrels.

COSIA has also announced 10 "challenges" it is facing.

"Challenges are documents that explicitly describe an innovation need in technical language," says Dan Wicklum, COSIA's chief executive. "They describe a desired outcome—without prescribing the means for attaining the outcome, so we won't limit potential solutions."

The challenge areas are separated into water and GHGs. Under GHGs, they are:

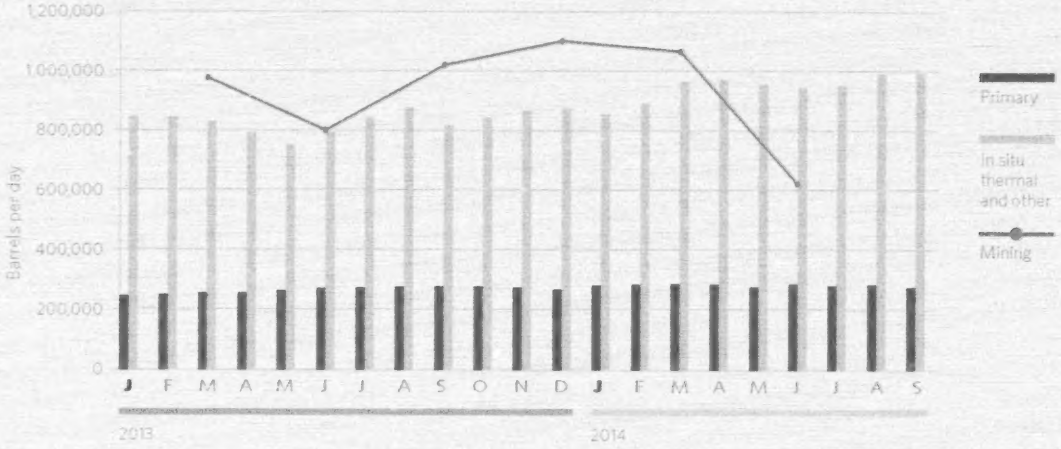
- Downhole steam generation
- Enriched combustion air
- Natural gas decarbonization
- Water and energy recovery
- New heat exchanger
- Pressure let down

Under water, the challenges are:

- Fouling-resistant once-through steam generators
- Fouling-resistant heat exchanger tubes
- High-temperature membrane separation
- Alternative silica-removal technologies

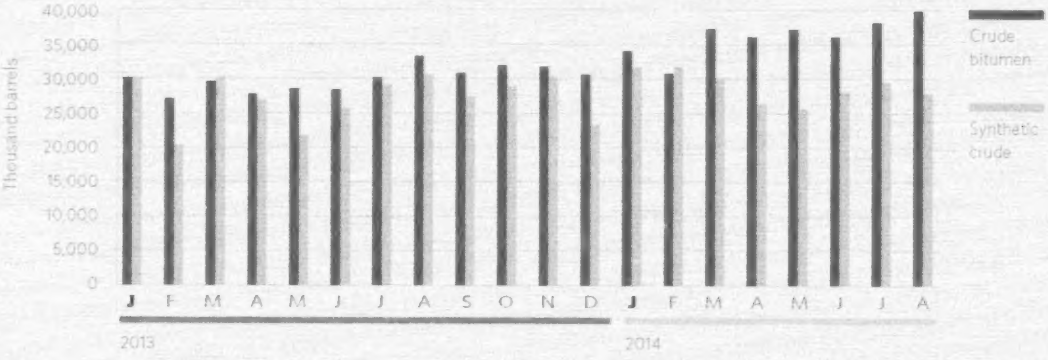
OIL SANDS PRODUCTION DATA

Alberta oil sands production by extraction method



SOURCE: ALBERTA ENERGY REGULATOR

Alberta crude bitumen and synthetic crude production



SOURCE: ALBERTA ENERGY REGULATOR

OIL SANDS TECHNOLOGY LEGEND See oil sands project status listing on page 10.

ADC USP (Upgrading) Accelerated decontamination, ultra-selective pyrolysis

AIRINJ Air injection

BEST Bitumen extraction solvent technology

C & SC Cyclic and solvent cyclic

C-SAGD Cyclic steam assisted gravity drainage

CSS Cyclic steam stimulation

ET-DSP Electro-thermal dynamic stripping

HCSS Horizontal cyclic steam stimulation

HTL Heavy-to-light upgrading process

In situ Production technology undisclosed; will use drilling and enhanced recovery

LP-SAGD Low-pressure steam assisted gravity drainage

Mining Truck and shovel mining

Orcrude Primary upgrading process

SAGD Steam assisted gravity drainage

SAP Solvent aided process

SC-SAGD Solvent cyclic steam assisted gravity drainage

TAGD Thermal assisted gravity drainage

THAI Toe to heel air injection

UPG Bitumen upgrading

VSD Vertical steam drive

PROJECT LISTINGS

See oil sands project technology legend on page 9

Updated status of oil sands projects in Alberta | As of November 2014

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
NORTH ATHABASCA REGION — MINING				
Canadian Natural Resources Limited				
Horizon				
Canadian Natural says that during the third quarter, it successfully completed the coker tie-in originally scheduled for 2015 and achieved effective subsequent expanded production ramp-up to 123,000 bbls/d in October. Overall the Phase 2/3 expansion is 50 per cent complete. The company has committed to approximately 67 per cent of the engineering, procurement and construction contracts. Over 68 per cent of the construction contracts have been awarded, with 85 per cent being lump sum, ensuring greater cost certainty.				
Phase 1	135,000	2008	OP	Mining
Reliability - Tranche 2	5,000	2014	OP	Mining
Phase 2A	12,000	2014	OP	Mining
Phase 2B	45,000	2016	UC	Mining
Phase 3	80,000	2017	UC	Mining
Imperial Oil Limited				
Kearl				
Imperial has confirmed that bitumen production has ramped up to pre-shutdown levels at its Kearl operations following a precautionary shutdown in early November, prompted by the detection of a vibration issue with the plant's ore-crusher unit.				
Phase 1	110,000	2013	OP	Mining
Phase 2	110,000	2015	UC	Mining
Phase 3	80,000	2020	Approved	Mining
Phase 3 Debottleneck	45,000	TBD	Approved	Mining
Shell Albian Sands				
Jackpine				
Phase 1A	100,000	2010	OP	Mining
Phase 1B	100,000	TBD	Approved	Mining
Expansion	100,000	2017	Approved	Mining
Muskeg River				
Commercial	155,000	2002	OP	Mining
Expansion & Debottlenecking	115,000	TBD	Approved	Mining
Pierre River				
Shell has informed regulators that it is indefinitely halting work on the Pierre River project. The company has asked that the regulatory approval process be suspended.				
Phase 1	100,000	TBD	HOLD	Mining
Phase 2	100,000	TBD	HOLD	Mining
Suncor Energy Inc.				
Base Operations				
Suncor says that oil sands production volumes increased to an average of 411,700 bbls/d in the third quarter of 2014, driven primarily by the completion of the Firebag ramp-up and smaller planned coker maintenance in the current year quarter compared to the prior year quarter, partially offset by a weather-related site-wide power outage and unplanned upgrader maintenance.				
Millennium Mine	294,000	1967	OP	Mining
Steepbank Debottleneck Phase 3	4,000	2007	OP	Mining
Millennium Debottlenecking	23,000	2008	OP	Mining
North Steepbank Extension	180,000	2012	OP	Mining
Fort Hills				
Suncor says that Fort Hills mining project activities remain focused on detailed engineering and procurement and the continued ramp-up of field construction activities. Key construction activities during the third quarter included foundation concrete pours, construction of primary extraction separation cells, construction of a camp lodge and commissioning of the water treatment facilities. Detailed engineering work was approximately 55 per cent complete by the end of the third quarter.				
Phase 1	150,000	2017	UC	Mining
Fort Hills *(continued)*				
Debottleneck	20,000	TBD	Approved	Mining
Voyageur South				
Suncor considers Voyageur South to be a longer-term project and has not confirmed a start-up date.				
Phase 1	120,000	TBD	APPL	Mining
Syncrude Canada Ltd.				
Mildred Lake/Aurora				
Canadian Oil Sands says that the Mildred Lake Mine Train Replacement project reached an estimated 99 per cent completion in the third quarter and is on schedule to be in service by the end of 2014. The Centrifuge Tailings Management project reached an estimated 90 per cent completion and is on schedule to be in service during the first half of 2015.				
Base Mine Stage 1 & 2 Expansion	290,700	1978	OP	Mining
Stage 3 Expansion	116,300	2006	OP	Mining
Centrifuge Tailings Management	TBD	TBD	OP	Mining
Aurora SouthTrain 1	100,000	TBD	Approved	Mining
Aurora SouthTrain 2	100,000	TBD	Approved	Mining
Mildred Lake Mine Extension (MLX)	TBD	2023	ANN	Mining
Teck Resources Limited				
Fontier				
Teck says that the regulatory review process for the Frontier project is expected to continue into 2015, making late 2015 or 2016 the earliest an approval decision and receipt of required permits is expected.				
Phase 1	74,6000	2021	APPL	Mining
Phase 2	84,000	2024	APPL	Mining
Phase 3	79,300	2027	APPL	Mining
Phase 4 Equinox	39,400	2030	APPL	Mining
Total E&P Canada Ltd.				
Joslyn North Mine				
Total has announced it will delay the Joslyn mine while project owners seek ways to reduce costs.				
Phase 1	100,000	TBD	HOLD	Mining
NORTH ATHABASCA REGION — IN SITU				
Athabasca Oil Corporation				
Birch				
Phase 1	12,000	TBD	ANN	SAGD
Dover West Carbonates (Leduc)				
Phase 1 Demonstration	6,000	2016	Approved	SAGD
Phase 2 Demonstration	6,000	TBD	APPL	SAGD
Dover West Sands & Clastics				
Phase 1	12,000	TBD	APPL	SAGD
Phase 2	35,000	2019	ANN	SAGD
Phase 3	35,000	2020	ANN	SAGD
Phase 4	35,000	2022	ANN	SAGD
Phase 5	35,000	2024	ANN	SAGD
BP p.l.c.				
Terre de Grace				
BP says that ongoing appraisal activities continue.				
Pilot	10,000	TBD	Approved	SAGD
Brion Energy Corporation				
Dover				
Dover Experimental Pilot	2,000	2017	Approved	SAGD
Dover North Phase 1	50,000	TBD	Approved	SAGD
Dover North Phase 2	50,000	TBD	Approved	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Dover *(continued)*				
Dover South Phase 3	50,000	2021	Approved	SAGD
Dover South Phase 4	50,000	2023	Approved	SAGD
Dover South Phase 5	50,000	2025	Approved	SAGD
Mackay River				
Phase 1	35,000	2015	UC	SAGD
Phase 1	35,000	2015	UC	SAGD
Phase 1	35,000	2015	UC	SAGD
Phase 1	35,000	2015	UC	SAGD
Canadian Natural Resources Limited				
Birch Mountain				
Canadian Natural says Birch is in the planning stages.				
Phase 1	60,000	2019	ANN	SAGD
Phase 2	60,000	2023	ANN	SAGD
Cenovus Energy Inc.				
East McMurray				
Cenovus says this project remains part of its portfolio of long-term development opportunities.				
Phase 1	30,000	TBD	ANN	SAGD
Steepbank				
Cenovus says this project remains part of its portfolio of long-term development opportunities.				
Phase 1	30,000	TBD	ANN	SAGD
Telephone Lake				
Cenovus received regulatory approval for Telephone Lake in November 2014. The company expects to make a decision on the timing of development in 2015.				
Phase A	45,000	TBD	Approved	SAGD
Phase B	45,000	TBD	Approved	SAGD
E-T Energy Ltd.				
Poplar Creek				
E-T Energy has engaged Sayer Advisors to dispose of its oil sands leases. The company is refocusing both its time and capital on the development of its technology.				
Experimental Pilot	1,000	2012	SUSP	ET-DSP
Phase 1	10,000	TBD	HOLD	ET-DSP
Phase 2	40,000	TBD	HOLD	ET-DSP
Grizzly Oil Sands ULC				
Thickwood				
The Alberta Energy Regulator says it will defer decisions on applications for in situ oil sands projects in the new shallow thermal area of the Athabasca region until it has developed formal regulatory requirements. Grizzly Thickwood is one of five impacted projects.				
Phase 1	6,000	2017	APPL	CSS_SAGD
Phase 2	6,00	TBD	APPL	CSS_SAGD
Husky Energy Inc.				
Saleski				
Husky filed the regulatory application for its Saleski pilot in early May 2013.				
Carbonate Pilot	3,000	2017	APPL	CSS
Sunrise				
Husky says that Sunrise Phase 1A is undergoing final commissioning, with the first 30,000-bbl/d central processing plant scheduled to start steaming around the end of 2014. Work continues to advance on the second 30,000-bbl/d plant, which is on track for start-up approximately six months after the first. Production is expected to ramp up over a two-year period.				
Phase 1A	30,000	2015	UC	SAGD
Phase 1B	30,000	2015	UC	SAGD
Phase 2A	35,000	TBD	Approved	SAGD
Phase 2B	35,000	TBD	Approved	SAGD
Future Phases	70,000	TBD	Approved	SAGD
Imperial Oil Limited				
Aspen				
Alberta has issued the final terms of reference for Imperial's Aspen project.				
Phase 1	45,000	2020	APPL	SAGD
Phase 2	45,000	TBD	APPL	SAGD
Phase 3	45,000	TBD	APPL	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Ivanhoe Energy Inc.				
Tamarack				
Ivanhoe Energy says that it has suspended activity on the Tamarack project based on the uncertainty that there is no timeline defined by the Alberta Energy Regulator for a new regulatory framework for shallow SAGD projects and that there is no clarity as to a path for approval for its Tamarack application. Until there is greater regulatory certainty as to a path to approval, Ivanhoe will limit Tamarack spending to only essential items.				
Phase 1	20,000	TBD	APPL	SAGD
Phase 2	20,000	TBD	APPL	SAGD
Koch Exploration Canada Corporation				
Dunkirk				
Alberta has issued the proposed terms of reference for Koch's Dunkirk SAGD project, one of the first steps in the regulatory process.				
Phase 1	30,000	2018	ANN	SAGD
Phase 2	30,000	TBD	ANN	SAGD
Marathon Oil Corporation				
Birchwood				
Marathon says it expects to receive regulatory approval for the Birchwood project by the end of 2014. Upon receiving this approval, the company will further evaluate its development plans.				
Demonstration	12,000	2017	APPL	SAGD
Oak Point Energy Ltd.				
Lewis				
Pilot	1,720	TBD	Approved	SAGD
Prosper Petroleum Ltd.				
Rigel				
Prosper Petroleum filed its regulatory application for the Rigel SAGD project in November 2013.				
Phase 1	10,000	2017	APPL	SAGD
SilverWillow Energy Corporation				
Audet				
SilverWillow says its strategic process is still in progress, and it continues to engage with industry participants and investors who are active in the sector. The company is also active in the industry consultation process with the Alberta Energy Regulator regarding new rules for shallow SAGD projects. It is optimistic that there will be a favourable outcome for the shallow SAGD sector, but the timing and content of the new rules is still undefined.				
Pilot	12,000	2018	APPL	SAGD
Southern Pacific Resource Corp.				
STP-McKay				
Southern Pacific says that six of its well pairs are now equipped with inflow control devices (ICDs). The company believes three to five additional well pairs may be suitable for an ICD installation at a later date but will continue to monitor the results of the existing ICD installations before making that decision. It is expected to take several months before meaningful incremental production from these new workovers is steadily maintained.				
Phase 1	12,000	2012	OP	SAGD
Phase 1 Expansion	6,000	2016	APPL	SAGD
Phase 2A	12,000	2018	APPL	SAGD
Phase 2B	6,000	2018	APPL	SAGD
Suncor Energy Inc.				
Dover				
N-Solv Corporation says it has reached the milestone of 25,000 barrels of bitumen produced at its Dover pilot since start-up in spring 2014.				
Demonstration Plant	500	2014	OP	
Firebag				
Suncor says that during the third quarter of 2014, it completed ramp-up of Firebag Stage 4.				
Stage 1	35,000	2004	OP	SAGD
Stage 2	35,000	2006	OP	SAGD
Cogeneration and Expansion	25,000	2007	OP	SAGD
Stage 3	42,500	2011	OP	SAGD
Stage 4	42,500	2012	OP	SAGD
Stage 5	62,500	2018	Approved	SAGD
Stage 6	62,500	2019	Approved	SAGD
Stage 3-6 Debottleneck	23,000	TBD	APPL	SAGD
Lewis				
Phase 1	40,000	TBD	ANN	IN SITU
Phase 2	40,000	TBD	ANN	IN SITU

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Suncor Energy Inc. *(continued)*				
MacKay River				
Suncor says that it continues to work toward a sanction decision on the MacKay River expansion project. First oil was achieved from wells associated with the MacKay River facility debottleneck project during the third quarter of 2014.				
Phase 1	33,000	2002	OP	SAGD
Debottleneck	5,000	2014	OP	SAGD
MR2	20,000	2017	Approved	SAGD
Sunshine Oilsands Ltd.				
Legend Lake				
Phase A1	10,000	2016	APPL	SAGD
Phase A2	30,000	TBD	ANN	SAGD
Phase B1	30,000	TBD	ANN	SAGD
Phase B2	30,000	TBD	ANN	SAGD
West Ells				
Sunshine Oilsands says it is on track for first steam at the end of the first quarter of 2015 and for first production in the third quarter of 2015. The company says it is firmly focused on ensuring success of the approved phases of West Ells.				
Phase A1	5,000	2015	UC	SAGD
Phase A2	5,000	TBD	Approved	SAGD
Phase A3	30,000	TBD	ANN	SAGD
Phase B	20,000	TBD	ANN	SAGD
Phase C1	30,000	TBD	ANN	SAGD
Phase C2	30,000	TBD	ANN	SAGD
SOUTH ATHABASCA REGION — IN SITU				
Athabasca Oil Corporation				
Hangingstone				
Athabasca says it has reached 94 per cent completion on Hangingstone Project 1 and project costs are tracking in line with sanctioned budget costs, with first steam expected by the end of the first quarter of 2015.				
HS-1	12,000	2014	UC	SAGD
HS-2A Debottleneck (1 and 2)	8,000	2017	APPL	SAGD
HS-2B Expansion	32,000	2019	APPL	SAGD
HS-3	30,000	2021	APPL	SAGD
BlackPearl Resources Inc.				
Blackrod				
Production continues to ramp up from the second pilot well pair at Blackrod. The well pair has produced over 50,000 barrels of oil since March 2014, and during the third quarter production, the second well pair averaged 316 bbls/d of oil with a steam to oil ratio of approximately 3.3:1. Recent oil analysis from the well indicates the well pair is still in the early stages of steam chamber development. It is expected to reach target peak production of 500–600 bbls/d of oil in the next six to nine months.				
Pilot	800	2011	OP	SAGD
Phase 1	20,000	TBD	APPL	SAGD
Phase 2	30,000	2018	APPL	SAGD
Phase 3	30,000	2021	APPL	SAGD
Canadian Natural Resources Limited				
Gregoire Lake				
Canadian Natural says Gregoire Lake is in the planning stages.				
Phase 1	60,000	TBD	ANN	SAGD
Phase 2	60,000	TBD	ANN	SAGD
Grouse				
Commercial	40,000	2013	OP	SAGD
Kirby				
Canadian Natural says that during the third quarter, production averaged approximately 18,100 bbls/d, reflecting the impact of the previously announced mechanical issues at the steam generating facility. The company has remedied these issues and production ramp-up has resumed. October 2014 production averaged approximately 22,000 bbls/d, and current production is averaging approximately 25,000 bbls/d, reflecting the strong performance of the reservoir.				
KS1 - Kirby South	40,000	2013	OP	SAGD
KN1 - Kirby North	40,000	2017	UC	SAGD
KN2 - Kirby North	60,000	2022	Approved	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Cavalier Energy Inc.				
Hoole				
Regulatory approval for the first phase of the Hoole project was granted in June 2014. Development of this phase is dependent upon Cavalier Energy securing financing and sanctioning by its board of directors. In July 2014, Cavalier acquired approximately 23 net sections of undeveloped land contiguous with its Hoole lands for $20 million.				
Phase 1	10,000	2017	Approved	SAGD
Phase 2A	35,000	TBD	ANN	SAGD
Phase 2B	35,000	TBD	ANN	SAGD
Cenovus Energy Inc.				
Christina Lake				
Cenovus says it continues to make progress on construction of Phases F and G.				
Phase 1A	10,000	2002	OP	SAGD
Phase 1B	8800	2008	OP	SAGD
Phase C	40,000	2011	OP	SAGD
Phase D	40,000	2012	OP	SAGD
Phase E	40,000	2013	OP	SAGD
Optimization (Phases C, D, E)	22,000	2015	Approved	SAGD
Phase F	50,000	2016	UC	SAGD
Phase G	50,000	2017	Approved	SAGD
Phase H	50,000	2019	APPL	SAGD
Foster Creek				
Cenovus says the Foster Creek Phase F main plant began processing oil in the third quarter. The company continues to progress construction of the Phase G and Phase H plants. Alberta's environmental assessment director has deemed the environmental impact assessment report complete for the Foster Creek Phase J expansion.				
Phase A	24,000	2001	OP	SAGD
Phase B Debottleneck	6,000	2003	OP	SAGD
Phase C Stage 1	10,000	2005	OP	SAGD
Phase C Stage 2	20,000	2007	OP	SAGD
Phase D	30,000	2009	OP	SAGD
Phase E	30,000	2009	OP	SAGD
Phase F	30,000	2014	OP	SAGD
Phase G	30,000	2015	UC	SAGD
Phase H	30,000	2016	UC	SAGD
Future Optimization (Phases F,G,H)	35,000	TBD	ANN	SAGD
Phase J	50,000	2019	APPL	SAGD
Future Optimization	15,000	TBD	ANN	SAGD
Grand Rapids				
Cenovus has begun decommissioning an existing SAGD central plant facility that it purchased earlier this year and plans to relocate it to the Grand Rapids site for use at Phase A. Meanwhile, work continues on the SAGD pilot project, which has two producing well pairs.				
Pelican Lake Pilot	600	2011	OP	SAGD
Pelican Upper Grand Rapids Phase A	10,000	2017	Approved	SAGD
Pelican Upper Grand Rapids Phase B	32,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase C	29,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase D	29,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase E	32,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase F	29,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase G	19,000	TBD	Approved	SAGD
Narrows Lake				
Cenovus says that work on Phase A continues to progress.				
Phase A	45,000	2017	UC	SAP
Phase B	45,000	TBD	Approved	SAP
Phase C	40,000	TBD	Approved	SAP
West Kirby				
Cenovus says this project remains part of its portfolio of long-term development opportunities.				
Phase 1	30,000	TBD	ANN	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Cenovus Energy Inc. (*continued*)				
Winefred Lake				
Cenovus says this project remains part of its portfolio of long term development opportunities.				
Phase 1	30,000	TBD	ANN	SAGD
CNOOC Limited				
Long Lake				
Phase 1	72,000	2008	OP	SAGD
Kinosis (K1A)	40,000	TBD	UC	SAGD
Kinosis (K1B)	40,000	TBD	Approved	SAGD
Connacher Oil and Gas Limited				
Great Divide				
Connacher has engaged BMO Capital Markets as financial adviser while it undergoes a process to design and implement a strategy to address its liquidity and capital structure.				
Pod One	10,000	2007	OP	SAGD
Algar	10,000	2010	OP	SAGD
Expansion 1A	12,000	TBD	Approved	SAGD
Expansion 1B	12,000	TBD	Approved	SAGD
ConocoPhillips Canada Limited				
Surmont				
ConocoPhillips says a major turnaround was completed at Surmont 1 during the third quarter and that Surmont 2 remains on track for first steam in mid-2015.				
Pilot	1,200	1997	OP	SAGD
Phase 1	30,000	2007	OP	SAGD
Phase 2	118,000	2015	UC	SAGD
Phase 3 - Tranche 1	45,000	2020	APPL	SAGD
Phase 3 - Tranche 2	45,000	2021	APPL	SAGD
Phase 3 - Tranche 3	45,000	2023	APPL	SAGD
Devon Canada Corporation				
Jackfish				
Devon says that first oil was achieved at Jackfish 3 in the third quarter.				
Phase 1	35,000	2007	OP	SAGD
Phase 2	35,000	2011	OP	SAGD
Phase 3	35,000	2014	OP	SAGD
Jackfish East				
Expansion	20,000	2018	ANN	SAGD
Pike				
Devon received regulatory approval for the Pike project in November 2014. Completion of the front-end engineering design, the capital budget and a work plan are expected in the fourth quarter of 2015. First steam is expected at the end of 2018.				
1A	35,000	2016	Approved	SAGD
1B	35,000	2017	Approved	SAGD
1C	35,000	2018	Approved	SAGD
Grizzly Oil Sands ULC				
Algar Lake				
Grizzly part-owner Gulfport Energy Corporation says that all 10 well pairs were converted to SAGD production mode during the third quarter of 2014. Grizzly continues to anticipate the first phase of this facility to reach its peak production potential of approximately 6,200 bbls/d of bitumen in the second quarter of 2015.				
Phase 1	6,000	2014	OP	SAGD
Phase 2	6,000	TBD	Approved	SAGD
May River				
Grizzly filed the regulatory application for May River phases 1 and 2 in December 2012. The company plans to file the regulatory application for a 90,000 bbl/d full field development by December 2016.				
Phase 1	6,000	2016	APPL	SAGD
Phase 1	6,000	TBD	APPL	SAGD
Harvest Operations Corp.				
BlackGold				
Harvest says that on Sept. 30, 2014, Phase 1 of the BlackGold project was approximately 97 per cent complete. Phase 1 completion, commissioning of the CPF and first steam are expected in the first quarter of 2015.				
Phase 1	10,000	2015	OP	SAGD
Phase 2	20,000	TBD	Approved	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Japan Canada Oil Sands Limited				
Hangingstone				
The Hangingstone expansion will receive its diluent from Inter Pipeline Ltd.'s Polaris Pipeline. Additionally, Aquatech has been awarded a contract to provide its evaporator technology for OTSG blowdown treatment.				
Expansion	20,000	2016	UC	SAGD
Hangingstone Pilot				
Pilot	11,000	1999	OP	SAGD
Koch Exploration Canada Corporation				
Muskwa				
Regulatory approval granted in June 2014.				
Pilot	10,000	2015	Approved	SAGD
Laricina Energy Ltd.				
Germain				
Laricina says that the Germain project achieved a September monthly production average of 726 bbls/d of bitumen. The four well pairs with producers in the bitumen zone have all been converted to production and solvent injection was initiated in one of the well pairs during the third quarter.				
Phase 1 CDP	5,000	2013	OP	SC-SAGD
Phase 2	30,000	2018	APPL	SC-SAGD
Phase 3	60,000	TBD	APPL	SC-SAGD
Phase 4	60,000	TBD	APPL	SC-SAGD
Saleski				
Laricina says that during the third quarter, the priority at the Saleski pilot was on the Grosmont D and understanding how best to drill and operate in the D zone to maximize production and ultimate recovery. The most recently drilled well at the pilot in the D zone continues to demonstrate production and steam to oil ratios (SORs) that complement C-zone production and SORs, demonstrating that the Grosmont can be competitive with average McMurray in situ projects.				
Experimental Pilot	1,800	2011	OP	Cyclic and SC-SAGD
Phase 1	10,700	2017	Approved	Cyclic SAGD
Phase 2	30,000	TBD	ANN	IN SITU
Phase 3	60,000	TBD	ANN	IN SITU
Phase 4	60,000	2023	ANN	IN SITU
Phase 5	60,000	2026	ANN	IN SITU
Phase 6	60,000	TBD	ANN	IN SITU
MEG Energy Corporation				
Christina Lake				
MEG says that production during the third quarter of 2014 increased to a record of 76,471 bbls/d, more than 120 per cent over comparative third quarter 2013 production, reflecting the ramp-up of the Christina Lake Phase 2B project, as well as incremental production associated with the company's RISER initiative on phases 1 and 2 of the Christina Lake project.				
Phase 1 Pilot	3,000	2008	OP	SAGD
Phase 2A	22,000	2009	OP	SAGD
Phase 2B	35,000	2013	OP	SAGD
Phase 3A	50,000	2016	Approved	SAGD
Phase 3B	50,000	2018	Approved	SAGD
Phase 3C	50,000	2020	Approved	SAGD
Surmont				
The environmental assessment director has deemed the environmental impact assessment report complete for MEG Energy's Surmont project.				
Phase 1	40,000	TBD	APPL	SAGD
Phase 2	40,000	TBD	APPL	SAGD
Phase 3	40,000	TBD	APPL	SAGD
Osum Oil Sands Corp.				
Sepiko Kesik				
Osum says it anticipates regulatory approval for Sepiko Kesik in 2015.				
Phase 1	30,000	2018	APPL	CSS-SAGD
Phase 2	30,000	2020	APPL	CSS-SAGD
PTT Exploration and Production				
Mariana - Hangingstone				
Phase 1	20,000	TBD	HOLD	SAGD
Mariana - South Leismer				
Phase 1	20,000	TBD	HOLD	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
PTT Exploration and Production *(continued)*				
Mariana - Thornbury				
Phase 1	40,000	TBD	HOLD	SAGD
Expansion	20,000	TBD	HOLD	SAGD
Renergy Petroleum (Canada) Co., Ltd.				
Muskwa				
Renergy Petroleum, an affiliate of Changjiang Investment Group, Co., Ltd., has applied to construct and operate a one-year pilot project on an existing wellsite that would test a proprietary steam and CO_2 cogeneration and co-injection scheme.				
Muskwa Experimental Pilot	TBD	2015	APPL	Steam co-injection
Statoil				
Corner				
Statoil says it will delay the Corner project for at least three years, citing rising costs and market access issues.				
Phase 1	40,000	TBD	HOLD	SAGD
Expansion	40,000	TBD	HOLD	SAGD
Leismer				
Demonstration	10,000	2010	OP	SAGD
Commercial	10,000	TBD	Approved	SAGD
Expansion	20,000	TBD	Approved	SAGD
Northwest	20,000	TBD	APPL	SAGD
Suncor Energy Inc.				
Chard				
Phase 1	40,000	TBD	ANN	In Situ
Meadow Creek East				
Phase 1	20,000	2020	Approved	SAGD
Phase 2	30,000	2022	Approved	SAGD
Phase 3	30,000	TBD	Approved	SAGD
Surmont Energy Ltd.				
Wildwood				
The Wildwood project is waiting on Alberta Energy Regulator approval. Surmont says that financing is not currently in place, but there are several interested parties in Asia and domestically for either a joint venture or straight investment.				
Phase 1	12,000	2015	APPL	SAGD
Value Creation Inc.				
Advanced TriStar				
The Alberta Energy Regulator says it will defer decisions on applications for in situ oil sands projects in the new shallow thermal area of the Athabasca region until it has developed formal regulatory requirements. Advanced TriStar is one of five impacted projects.				
ATS-1	15,000	2016	APPL	SAGD
ATS-2	30,000	2018	APPL	SAGD
ATS-3	30,000	2020	APPL	SAGD
TriStar				
Value Creation says it is funded for the TriStar project but has not yet decided on a construction timeline.				
Pilot	1,000	TBD	Approved	SAGD
COLD LAKE REGION — IN SITU				
Baytex Energy Corp.				
Gemini				
Baytex planned to file a regulatory amendment for a 5,000-bbl/d SAGD project (versus the approved 10,000-bbl/d SAGD project) in the fourth quarter. The amendment will include additional delineated lands as well as capture various facility modifications. While this regulatory step is necessary to progress the project, Baytex says that a final investment decision is contingent upon a full economic review and the outcome of the front-end engineering study, which is currently in progress.				
Pilot	1,200	2014	OP	SAGD
Commercial	5,000	2017	Approved	SAGD
Birchwood Resources Inc.				
Sage				
Birchwood Resources has engaged Sayer Energy Advisors in a strategic review process.				
Pilot	5,000	TBD	APPL	Low pressure SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Canadian Natural Resources Limited				
Primrose & Wolf Lake				
Canadian Natural says its stepwise plan to return to steaming operations at Primrose with enhanced mitigation strategies in place has progressed. A low-pressure steamflood is now operating at Primrose East Area 1 and is performing as expected. Primrose South received approval for additional CSS on four pads in September 2014; production is targeted to ramp up in 2015. Additionally, during the third quarter, an application for low-pressure CSS was submitted to the Alberta Energy Regulator for Primrose East Area 2.				
Wolf Lake	13,000	1985	OP	CSS
Primrose South	45,000	1985	OP	CSS
Primrose North	30,000	2006	OP	CSS
Primrose East	32,000	2008	OP	CSS
Devon Canada Corporation				
Walleye				
Devon says the Walleye project is currently on hold.				
Phase 1	9,000	2016	APPL	SAGD
Husky Energy Inc.				
Caribou				
Demonstration	10,000	TBD	Approved	SAGD
Tucker				
Maintenance turnaround planned for the third quarter of 2015.				
Phase 1	30,000	2006	OP	SAGD
Imperial Oil Limited				
Cold Lake				
Imperial says that the Nabiye project advanced to 96 per cent complete during the third quarter. Initial steam injection remains targeted for year-end 2014 with initial bitumen production anticipated in the first quarter of 2015.				
Phase 1-10	110,000	1985	OP	CSS
Phase 11-13	30,000	2002	OP	CSS
Experimental SA-SAGD	TBD	2013	OP	SA-SAGD
Phase 14-16	40,000	2015	UC	CSS
Osum Oil Sands Corp.				
Orion				
Osum says that operational improvements to progressively increase production to 10,000 bbl/d will be pursued in 2014-16 and funded through cash flow.				
Phase 1	12,500	TBD	Approved	SAGD
Phase 2	12,500	TBD	Approved	SAGD
Taiga				
Osum says that Taiga Phase 1 will be advanced in 2015-16 subject to financing.				
Phase 1	12,500	TBD	Approved	CSS & SAGD
Phase 2	12,500	TBD	Approved	CSS & SAGD
Phase 3	20,000	TBD	Approved	CSS & SAGD
Pengrowth Energy Corporation				
Lindbergh				
Pengrowth says that in October, commissioning and start-up activities commenced at the 12,500-bbl/d Lindbergh commercial facility. It is anticipated that steam will be circulated through the well pairs starting in early December. Using the pilot ramp-up as an analog, first oil is expected in January of 2015.				
Pilot	1,260	2012	OP	SAGD
Phase 1	11,240	2015	UC	SAGD
Phase 2 Expansion	17,500	2017	APPL	SAGD
Phase 3	20,000	2018	ANN	SAGD
PEACE RIVER REGION — IN SITU				
Andora Energy Corporation				
Sawn Lake				
Andora majority owner Pan Orient Energy says that early stage production numbers compare favourably to an analogous reservoir in a demonstration project operated by another company of similar reservoir type that is being monitored as a basis of comparison.				
Demonstration	1,400	2014	OP	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Baytex Energy Corp.				
Cliffdale				
Baytex says that in the second quarter, thermal operations continued as planned with steam injection at Pad 2 commencing on schedule in early June. A modified injection and completion strategy to improve uniform horizontal well heat distribution is showing early positive results.				
Pilot	2,000	2011	OP	CSS
Harmon Valley				
Pilot	TBD	2011	OP	CSS
Murphy Oil Company Ltd.				
Cadotte				
Pilot	TBD	TBD	Cancelled	VSD
Seal/Cadotte				
Murphy says the two-well pilot is showing promise, with the second well showing the best response. Production in early 2014 had reached as high as 670 bbls/d with a steam to oil ratio of 1.8:1.				
Pilot	TBD	TBD	OP	CSS
Northern Alberta Oil Ltd.				
Sawn Lake				
Pilot	700	TBD	Approved	Horizontal CSS
Penn West Petroleum Ltd.				
Harmon Valley South				
Pilot	TBD	2014	OP	Horizontal CSS
Seal Main				
Pilot	75	2011	OP	Horizontal CSS
Commercial	10,000	2015	APPL	Horizontal CSS
Royal Dutch Shell plc				
Peace River				
Cadotte Lake	12,500	1986	OP	CSS
Carmon Creek - Phase 1	40,000	2017	UC	VSD
Carmon Creek - Phase 2	40,000	2018	Approved	VSD
Touchstone Explorations Inc.				
Dawson				
Experimental Demonstration	TBD	2014	OP	CSS
Phase 2	10,000	TBD	ANN	CSS
NORTH ATHABASCA REGION — UPGRADER				
BP p.l.c.				
Terre de Grace				
BP says that ongoing appraisal activities continue.				
Pilot	8,400	TBD	Approved	UPG
Horizon				
Canadian Natural says that during the third quarter, it successfully completed the coker tie-in originally scheduled for 2015 and achieved effective subsequent expanded production ramp-up to 123,000 bbls/d in October. Overall the Phase 2/3 expansion is 50 per cent complete. The company has committed to approximately 67 per cent of the engineering, procurement and construction contracts. Over 68 per cent of the construction contracts have been awarded, with 85 per cent being lump sum, ensuring greater cost certainty.				
Phase 1	110,000	2009	OP	UPG
Reliability - Tranche 2	5,000	2014	OP	UPG
Phase 2A	12,000	2014	OP	UPG
Phase 2B	45,000	2016	UC	UPG
Phase 3	80,000	2017	UC	UPG
Ivanhoe Energy Inc.				
Tamarack				
Ivanhoe Energy says it has suspended activity on the Tamarack project based on the uncertainty that there is no timeline defined by the Alberta Energy Regulator for a new regulatory framework for shallow SAGD projects and that there is no clarity as to a path for approval for its Tamarack application. Until there is greater regulatory certainty as to a path to approval, Ivanhoe will limit Tamarack spending to only essential items.				
Phase 1	34,784	2017	APPL	UPG
Suncor Energy Inc.				
Base Operations				
Suncor says that oilsands production volumes increased to an average of 411,700 bbls/d in the third quarter of 2014, driven primarily by the completion of the Firebag ramp-up and smaller planned coker maintenance in the current year quarter compared to the prior year quarter, partially offset by a weather-related site-wide power outage and unplanned upgrader maintenance.				
U1 and U2	225,000	1967	OP	UPG
Millennium Vacuum Unit	35,000	2006	OP	UPG
Millennium Coker Unit	97,000	2008	OP	UPG
Syncrude Canada Ltd.				
Mildred Lake/Aurora				
Canadian Oil Sands says that the Mildred Lake Mine Train Replacement project reached an estimated 99 per cent completion in the third quarter and is on schedule to be in service by the end of 2014. The Centrifuge Tailings Management project reached an estimated 90 per cent completion and is on schedule to be in service during the first half of 2015.				
Base Plant Stage 1 & 2 Debottleneck	250,000	1978	OP	UPG
Stage 3 Expansion (UE-1)	100,000	2006	OP	UPG
Stage 3 Debottleneck	75,000	TBD	ANN	UPG
SOUTH ATHABASCA REGION				
CNOOC Limited				
Long Lake				
Phase 1	58,500	2009	OP	UPG
Value Creation Inc.				
Advanced TriStar				
The Alberta Energy Regulator says it will defer decisions on applications for in situ oilsands projects in the new shallow thermal area of the Athabasca region until it has developed formal regulatory requirements. Advanced TriStar is one of five impacted projects.				
ATS-1	12,750	2016	APPL	UPG
ATS-2	25,500	2018	APPL	UPG
ATS-3	25,500	2020	APPL	UPG
TriStar				
Value Creation says it is funded for the TriStar project but has not yet decided on a construction timeline.				
Pilot	820	TBD	Approved	UPG
INDUSTRIAL HEARTLAND REGION — UPGRADER				
North West Upgrading Inc.				
Redwater Upgrader				
North West Upgrading says that construction activity continues with the refinery site steadily rising above grade. With deep undergrounds largely in place, process unit area construction is well underway.				
ATS-3	25,500	2020	APPL	UPG
ATS-3	25,500	2020	APPL	UPG
ATS-3	25,500	2020	APPL	UPG
Shell Albian Sands				
Scotford Upgrader				
Commercial	155,000	2003	OP	UPG
Expansion	100,000	2011	OP	UPG
Value Creation Inc.				
Heartland				
Reports are that Value Creation could be up and running within 18 months of project sanction, but funding remains unclear.				
Phase 1	46,300	TBD	HOLD	UPG
Phase 2	46,300	TBD	Approved	UPG
Phase 3	46,300	TBD	Approved	UPG

GLOSSARY of oil sands terms

ASPHALTENES
The heaviest and most concentrated aromatic hydrocarbon fractions of bitumen.

BARREL
The traditional measurement for crude oil volumes. One barrel equals 42 U.S. gallons (159 litres). There are 6.29 barrels in one cubic metre of oil.

BITUMEN
Naturally occurring, viscous mixture of hydrocarbons that contains high levels of sulphur and nitrogen compounds. In its natural state, it is not recoverable at a commercial rate through a well because it is too thick to flow. Bitumen typically makes up about 10 per cent by weight of oil sand, but saturation varies.

COGENERATION
The simultaneous production of electricity and steam, which is part of the operations of many oil sands projects.

COKING
An upgrading/refining process used to convert the heaviest fraction of bitumen into lighter hydrocarbons by rejecting carbon as coke. Coking can be either delayed coking (semi-batch) or fluid coking (continuous).

CONDENSATE
Mixture of extremely light hydrocarbons recoverable from gas reservoirs. Condensate is also referred to as a natural gas liquid, and is used as a diluent to reduce bitumen viscosity for pipeline transportation.

CONVENTIONAL CRUDE OIL
Mixture of mainly pentane and heavier hydrocarbons recoverable at a well from an underground reservoir, and liquid at atmospheric pressure and temperature. Unlike bitumen, it flows through a well without stimulation and through a pipeline without processing or dilution.

CRACKING
An upgrading/refining process for converting large, heavy molecules into smaller ones. Cracking processes include fluid cracking and hydrocracking.

CYCLIC STEAM STIMULATION (CSS)
An in situ production method incorporating cycles of steam injection, steam soaking and oil production. The steam reduces the viscosity of the bitumen and allows it to flow to the production well.

DENSITY
The heaviness of crude oil, indicating the proportion of large, carbon-rich molecules, generally measured in kilograms per cubic metre (kg/m^3) or degrees on the American Petroleum Institute (API) gravity scale; in western Canada, oil up to 900 kg/m^3 is considered light-to-medium crude—oil above this density is deemed as heavy oil or bitumen.

DILBIT
Bitumen that has been reduced in viscosity through addition of a diluent such as condensate or naphtha.

DILUENT
A light hydrocarbon blended with bitumen to enable pipeline transport. See Condensate.

EXTRACTION
A process, unique to the oil sands industry, that separates the bitumen from the oil sand using hot water, steam and caustic soda.

FROTH TREATMENT
The means to recover bitumen from the mixture of water, bitumen and solids "froth" produced in hot-water extraction (in mining-based recovery).

GASIFICATION
A process to partially oxidize any hydrocarbon, typically heavy residues, to a mixture of hydrogen and carbon monoxide. Can be used to produce hydrogen and various energy by-products.

GROUNDWATER
Water accumulations below the Earth's surface that supply fresh water to wells and springs.

HEAVY CRUDE OIL
Oil with a gravity below 22 degrees API. Heavy crudes must be blended or mixed with condensate to be shipped by pipeline.

HYDROCRACKING
Refining process for reducing heavy hydrocarbons into lighter fractions, using hydrogen and a catalyst; can also be used in upgrading bitumen.

HYDROTRANSPORT
A slurry process that transports water and oil sand through a pipeline to primary separation vessels located in an extraction plant.

HYDROTREATER
An upgrading/refining process unit that reduces sulphur and nitrogen levels in crude oil fractions by catalytic addition of hydrogen.

IN SITU
A Latin phrase meaning "in its original place." In situ recovery refers to various drilling-based methods used to recover deeply buried bitumen deposits.

IN SITU COMBUSTION
An enhanced oil recovery method that works by generating combustion gases (primarily CO and CO_2) downhole, which then "push" the oil towards the recovery well.

LEASE
A legal document from the province of Alberta giving an operator the right to extract bitumen from the oil sand existing within the specified lease area. The land must be reclaimed and returned to the Crown at the end of operations.

LIGHT CRUDE OIL
Liquid petroleum with a gravity of 28 degrees API or higher. A high-quality light crude oil might have a gravity of about 40 degrees API. Upgraded crude oils from the oil sands run around 30-33 degrees API (compared to 32-34 for Light Arab and 37-40 for West Texas Intermediate).

MATURE FINE TAILINGS
A gel-like material resulting from the processing of clay fines contained within the oil sands.

OIL SANDS
Bitumen-soaked sand deposits located in three geographic regions of Alberta: Athabasca, Cold Lake and Peace River. The Athabasca deposit is the largest, encompassing more than 42,340 square kilometres. Total in-place deposits of bitumen in Alberta are estimated at 1.7 trillion to 2.5 trillion barrels.

OVERBURDEN
A layer of sand, gravel and shale between the surface and the underlying oil sand in the mineable oil sands region that must be removed before oil sands can be mined.

PERMEABILITY
The capacity of a substance (such as rock) to transmit a fluid, such as crude oil, natural gas or water. The degree of permeability depends on the number, size and shape of the pores and/or fractures in the rock and their interconnections. It is measured by the time it takes a fluid of standard viscosity to move a given distance. The unit of permeability is the Darcy.

PETROLEUM COKE
Solid, black hydrocarbon that is left as a residue after the more valuable hydrocarbons have been removed from the bitumen by heating the bitumen to high temperatures.

PRIMARY PRODUCTION
An in situ recovery method that uses natural reservoir energy (such as gas drive, water drive and gravity drainage) to displace hydrocarbons from the reservoir into the wellbore and up to the surface. Primary production uses an artificial lift system in order to reduce the bottomhole pressure or increase the differential pressure to sustain hydrocarbon recovery, since reservoir pressure decreases with production.

RECLAMATION
Returning disturbed land to a stable, biologically productive state. Reclaimed property is returned to the province of Alberta at the end of operations.

STEAM ASSISTED GRAVITY DRAINAGE (SAGD)
An in situ production process using two closely spaced horizontal wells: one for steam injection and the other for production of the bitumen/water emulsion.

SURFACE MINING
Operations to recover oil sands by open-pit mining using trucks and shovels. Less than 20 per cent of Alberta's oil sands resources are located close enough to the surface (within 75 metres) for mining to be economic.

SYNTHETIC CRUDE OIL
A manufactured crude oil comprised of naphtha, distillate and gas oil-boiling range material. Can range from high-quality, light sweet bottomless crude to heavy, sour blends.

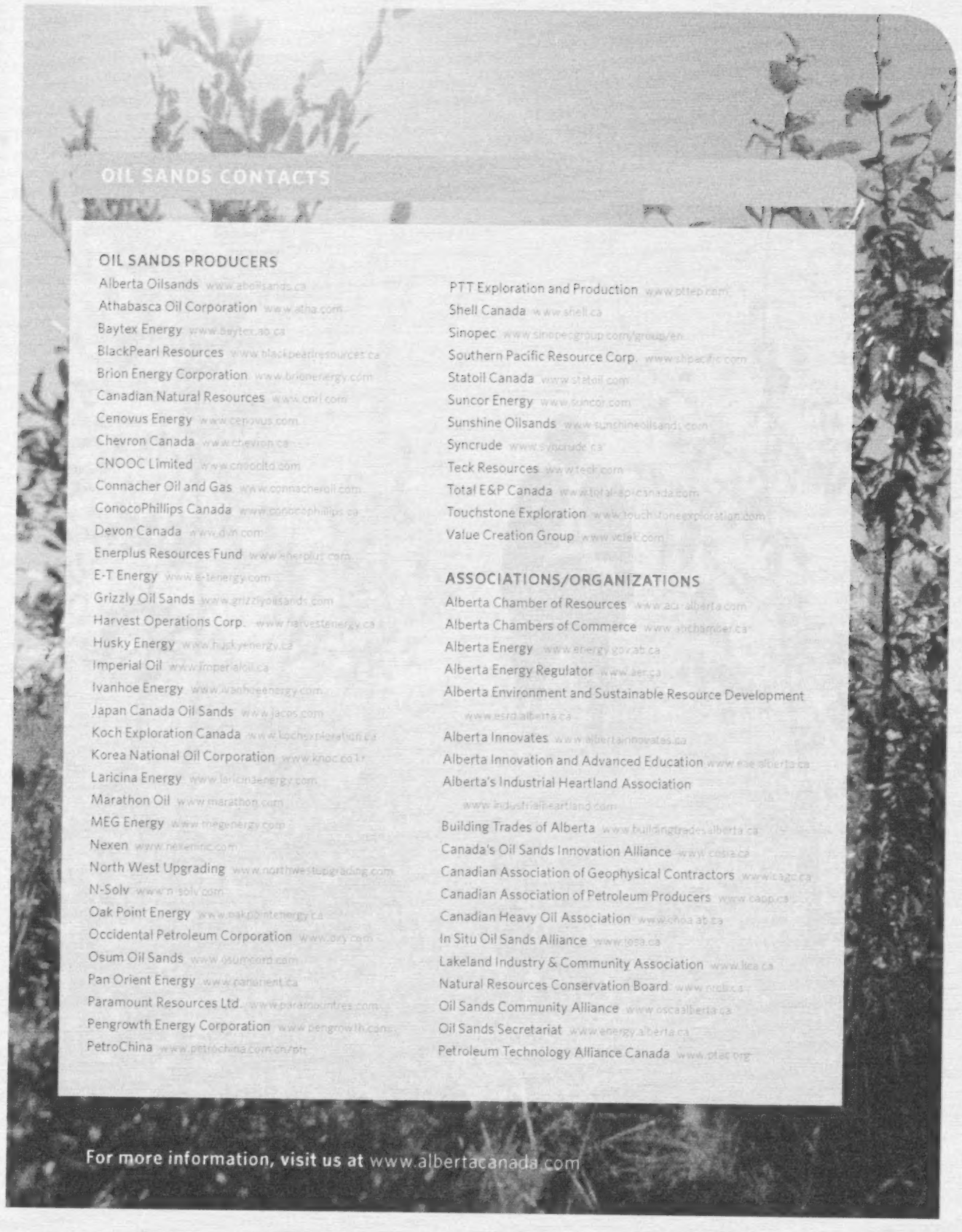
TAILINGS
A combination of water, sand, silt and fine clay particles that is a by-product of removing the bitumen from the oil sand through the extraction process.

TAILINGS SETTLING BASIN
The primary purpose of the tailings settling basin is to serve as a process vessel, allowing time for tailings water to clarify and silt and clay particles to settle so that the water can be reused in extraction. The settling basin also acts as a thickener, preparing mature fine tails for final reclamation.

THERMAL RECOVERY
Any in situ process where heat energy (generally steam) is used to reduce the viscosity of bitumen to facilitate recovery.

UPGRADING
The process of converting heavy oil or bitumen into synthetic crude either through the removal of carbon (coking) or the addition of hydrogen (hydroconversion).

VISCOSITY
The ability of a liquid to flow. The lower the viscosity, the more easily the liquid will flow.



OIL SANDS CONTACTS

OIL SANDS PRODUCERS

Alberta Oilsands www.aboilsands.ca
Athabasca Oil Corporation www.atha.com
Baytex Energy www.baytex.ab.ca
BlackPearl Resources www.blackpearlresources.ca
Brion Energy Corporation www.brionenergy.com
Canadian Natural Resources www.cnrl.com
Cenovus Energy www.cenovus.com
Chevron Canada www.chevron.ca
CNOOC Limited www.cnoocltd.com
Connacher Oil and Gas www.connacheroil.com
ConocoPhillips Canada www.conocophillips.ca
Devon Canada www.dvn.com
Enerplus Resources Fund www.enerplus.com
E-T Energy www.e-tenergy.com
Grizzly Oil Sands www.grizzlyoilsands.com
Harvest Operations Corp. www.harvestenergy.ca
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Imperial Oil www.imperialoil.ca
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Japan Canada Oil Sands www.jacos.com
Koch Exploration Canada www.kochexploration.ca
Korea National Oil Corporation www.knoc.co.kr
Laricina Energy www.laricinaenergy.com
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MEG Energy www.megenergy.com
Nexen www.nexeninc.com
North West Upgrading www.northwestupgrading.com
N-Solv www.n-solv.com
Oak Point Energy www.oakpointenergy.ca
Occidental Petroleum Corporation www.oxy.com
Osum Oil Sands www.osumcorp.com
Pan Orient Energy www.panorient.ca
Paramount Resources Ltd. www.paramountres.com
Pengrowth Energy Corporation www.pengrowth.com
PetroChina www.petrochina.com.cn/ptr
PTT Exploration and Production www.pttep.com
Shell Canada www.shell.ca
Sinopec www.sinopecgroup.com/group/en
Southern Pacific Resource Corp. www.shpacific.com
Statoil Canada www.statoil.com
Suncor Energy www.suncor.com
Sunshine Oilsands www.sunshineoilsands.com
Syncrude www.syncrude.ca
Teck Resources www.teck.com
Total E&P Canada www.total-epcanada.com
Touchstone Exploration www.touchstoneexploration.com
Value Creation Group www.vctek.com

ASSOCIATIONS/ORGANIZATIONS

Alberta Chamber of Resources www.acr-alberta.com
Alberta Chambers of Commerce www.abchamber.ca
Alberta Energy www.energy.gov.ab.ca
Alberta Energy Regulator www.aer.ca
Alberta Environment and Sustainable Resource Development www.esrd.alberta.ca
Alberta Innovates www.albertainnovates.ca
Alberta Innovation and Advanced Education www.eae.alberta.ca
Alberta's Industrial Heartland Association www.industrialheartland.com
Building Trades of Alberta www.buildingtradesalberta.ca
Canada's Oil Sands Innovation Alliance www.cosia.ca
Canadian Association of Geophysical Contractors www.cagc.ca
Canadian Association of Petroleum Producers www.capp.ca
Canadian Heavy Oil Association www.choa.ab.ca
In Situ Oil Sands Alliance www.iosa.ca
Lakeland Industry & Community Association www.lica.ca
Natural Resources Conservation Board www.nrcb.ca
Oil Sands Community Alliance www.oscaalberta.ca
Oil Sands Secretariat www.energy.alberta.ca
Petroleum Technology Alliance Canada www.ptac.org

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